APPARATUS AND METHOD FOR BUILDING DISTRIBUTED
FAULT-TOLERANT/HIGH-AVAILABILITY COMPUTER APPLICATIONS

ABSTRACT OF THE DISCLOSURE

Software architecture for developing distributed fault-tolerant systems independent of the underlying hardware architecture and operating system. Systems built using architecture components are scalable and allow a set of computer applications to operate in fault-tolerant/high-availability mode, distributed processing mode, or many possible combinations of distributed and fault-tolerant modes in the same system without any modification to the architecture components. The software architecture defines system components that are modular and address problems in present systems. The architecture uses a System Controller, which controls system activation, initial load distribution, fault recovery, load redistribution, and system topology, and implements system maintenance procedures. An Application Distributed Fault-Tolerant/High-Availability Support Module (ADSM) enables an application(s) to operate in various distributed fault-tolerant modes. The System Controller uses ADSM's well-defined API to control the state of the application in these modes. The Router architecture component provides transparent communication between applications during fault recovery and topology changes. An Application Load Distribution Module (ALDM) component distributes incoming external events towards the distributed application. The architecture allows for a Load Manager, which monitors load on various copies of the application and maximizes the hardware usage by providing dynamic load balancing. The architecture also allows for a Fault Manager, which performs fault detection, fault location, and fault isolation, and uses the System Controller's API to initiate fault recovery. These architecture components can be used to achieve a variety of distributed processing high-availability system configurations, which results in a reduction of cost and development time.